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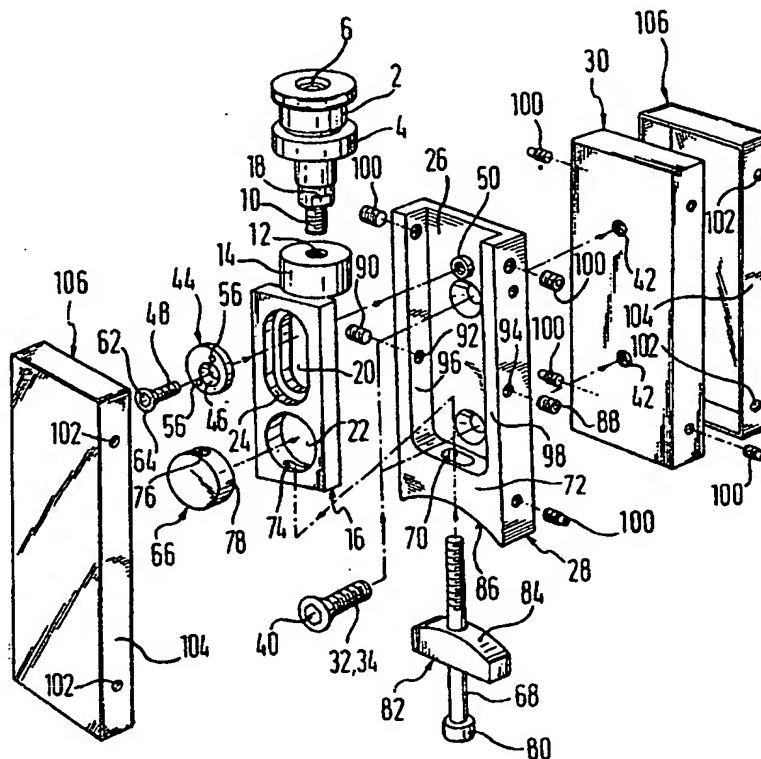
With international search report.

Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.

(54) Title: MOUNTING ASSEMBLY FOR SUSPENDING A GLASS-PANE SLIDING DOOR

## (57) Abstract

Mounting assembly for suspending a glass-pane sliding door from a horizontal rail, the assembly comprising at least one slide (6, 10) displaceable along the rail and at least one door carrier connectable to the slide and provided with two carrier plates (28, 30) receiving the glass-pane sliding door between the carrier plates (28, 30), characterised in that a coupling piece (16) of the door carrier is provided for connection to the slide (6, 10) and that the glass-pane sliding door equipped with the carrier plates (28, 30) and supported from below can be coupled to the coupling piece (16) and lifted from the supported position to a suspended position and vertically adjusted in the suspended position by a lifting and adjusting means accessible from one flat surface of the glass-pane sliding door.



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## Mounting Assembly for Suspending a Glass-Pane Sliding Door

The invention relates to a mounting assembly for suspending a glass-pane sliding door from a horizontal rail, the assembly comprising at least one slide displaceable along the rail and at least one door carrier connectable to the slide and provided with two carrier plates receiving the glass-pane sliding door between the carrier plates.

It is an object of the invention to teach a mounting assembly of this type allowing easy mounting and adjusting of the glass-pane sliding door without requiring a floor rail to be necessarily present for the glass-pane sliding door.

To achieve this object, the mounting assembly is characterised in that a coupling piece of the door carrier can be coupled to at least one slide by a mounting connection while the glass-pane sliding door is being supported from below, and that the door carrier can be lifted from the supported position to a suspended position and vertically adjusted in the suspended position by a lifting and adjusting means accessible from one flat surface of the glass-pane sliding door.

To enable the glass-pane sliding door to be adjusted also laterally (which may be necessary for driving the glass-pane sliding door into a parking pocket), the mounting assembly may in particular be characterised in that the coupling piece is horizontally adjustable relative to the door carrier in the direction of the flat sides of the glass-pane sliding door. This adjustment possibility is advantageous even independently of claim 1.

In order that an adjustment once accomplished be not lost, the mounting assembly is preferably characterised in that the coupling piece is arranged to be fixed in its adjusted position on the door carrier by a fixing means.

The construction of the adjusting means is particularly easy and accessible from one flat surface of the glass-pane sliding door, if the coupling piece is provided with an oblong hole and an eccentric is rotatably journaled on the door carrier between vertical longitudinal surfaces of the oblong hole and is arranged to be fixed in any angular position.

Adjustment and fixation in two degrees of freedom can be achieved by a single element, if the eccentric is rotatably journaled on a screw enabling the eccentric to be fixed in different angular and vertical positions relative to the coupling piece.

This arrangement provides an easy and positive force transfer from the eccentric to the coupling piece, if a front surface of the eccentric facing the coupling piece is seated on an inner peripheral shoulder of the oblong hole while a rear surface of the eccentric facing away from the coupling piece is flush with an outer surface of the coupling piece.

A compact accommodation of the coupling piece is achieved in that at least one of the carrier plates comprises a vertical channel closed by a lower end wall for receiving the coupling piece and that an adjusting screw penetrating an opening in the end wall can be screwed from below into the coupling piece and that a head of this screw is seated from below against the end wall when the glass-pane sliding door is in its suspended position.

To enable the vertical position to be adjusted in an easy and stable manner independently of the position of the coupling piece relative to the carrier plate, the mounting assembly is preferably characterised in that the adjusting screw passes through elongate holes in the end wall of the channel and in the coupling piece, respectively, which holes extend parallel to the flat surfaces of the glass-pane sliding door; that the adjusting screw engages a nut which is supported in the coupling piece and is rotatable about an axis perpendicular to the flat surfaces of the glass-pane sliding door; and that a thrust block is arranged between the screw head and the end wall of the carrier plate, a cylindrical convex upper surface of the thrust block being seated on a cylindrical concave lower surface of the end wall such that the adjusting screw can follow different positions of the coupling piece relative to the carrier plate.

In order to render the mounting assembly particularly compact, it is preferably characterised in that all parts received in the channel, and possibly also the thrust block, do

not exceed an exterior outline surface of the channel.

In order to achieve a central suspension of the glass-pane sliding door, the mounting assembly is preferably characterised in that the coupling piece comprises a lower  
 5 adjusting portion fixable in the channel and an upper mounting portion horizontally displaced relative to the adjusting portion transversely to the flat surfaces of the glass-pane sliding door, the mounting portion allowing the glass-pane sliding door to be attached centrically below the slide.

10 In order to give the mounting assembly an aligned appearance even if it is not precisely aligned, the mounting assembly is preferably characterised in that caps having dimensions exceeding those of the carrier plates are arranged to be mounted to the plates in different adapted positions.

15 An exemplary embodiment of the invention will now be described in greater detail with reference to the accompanying drawings wherein

Fig. 1 shows an exploded view of the mounting assembly,

20 Fig. 2 serves to illustrate the adjustment of the mounting assembly by means of a particular tool, and

Fig. 3 shows the application of the mounting assembly in a particular case.

Fig. 1 illustrates a mounting assembly that can be inserted in, and displaced along, a roller rail by means of two  
 25 rollers 2, 4 rotatable about a vertical shaft 6 independently of each other. The lower end of shaft 6 has a screw thread 10 to be screwed into a female thread 12 of a supported mounting portion 14 of a coupling piece 16. For this purpose, shaft 6 comprises flat surfaces 18 for a wrench which are arranged  
 30 above the screw thread 10. Further, the coupling piece 16 extends vertically and is provided with a circular hole 22 in its upper part. One side of the oblong hole 20 comprises an annular extension 24 in the form of a shoulder.

35 The coupling piece 16 is designed to be inserted with lateral clearance in a channel 26 of a carrier plate 28, the channel being open at the top. A one-piece glass-pane of a sliding glass door is to be clamped between this carrier plate 28 and another carrier plate 30 by means of screws 32, 34. The

screws 32, 34 are countersunk-head screws the heads 40 of which can be sunk in the bottom of channel 26 and which can be screwed into threaded holes 42 of the carrier plate 30, at the same time penetrating holes in the glass pane (not shown). The shoulder-like extension 24 receives an eccentric disk 44 provided with an eccentric hole through which a flat-head screw 48 can be screwed into an insert member 50 which is inserted in the carrier plate 28 such as to resist pulling and rotating. Turning the eccentric disk 44 about the axis of flat-head screw 48 causes the coupling piece 16 to be displaced laterally. To fix the eccentric disk 44, it is locked by pins 52 arranged on an auxiliary tool 54 and designed to be put into blind holes 56 on the free front side of eccentric disk 44. The auxiliary tool 54 has a centric hole 58 through which a polygonal wrench 60 can be inserted into a polygonal recess 62 in the head 64 of screw 48. Thus, the auxiliary tool 54 can lock the eccentric disk 44 in any desired angular position of the eccentric disk 44 while allowing the screw 48 to be tightened.

The circular hole 22 rotatably receives a round counter nut disk 66 for an adjusting screw 68 extending from the bottom through an elongate hole 70 disposed parallel to the flat sides of the glass-pane sliding door and penetrating a bottom end wall 72 of channel 26 in carrier plate 28; the adjusting screw further passes through a corresponding oblong hole 74 in coupling piece 16 and can engage a female thread 76 in counter nut disk 66 opening towards the circumference 78 of the counter nut disk 66. Between a lower head part 80 of screw 68 and the end wall 72, a thrust block 82 is provided having a cylindrical convex upper surface 84 seated on a complementary cylindrical concave lower surface 86 of end wall 72.

After the coupling piece 16 has been adjusted, it can be additionally fixed by worm screws 88, 90 engageable in female threads 92, 94 of the side walls 96, 98 of channel 26. Further worm screws 100 passing through female threads 102 in peripheral edges 104 of masking caps 106 allow the caps to be fastened to the carrier plates 28, 30 such that the caps can be aligned.

The embodiment of Fig. 3 provides two symmetrically formed

carrier plates 128, 130 similar to carrier plate 28, differing only in that their mounting portions 114 face away from each other. In this embodiment, the glass pane 132 can be curved about a vertical axis, in accordance with the curved roller rails 134, 136.

For assembly of each glass-pane sliding door, two "slides" are formed of the elements 2, 4, 6, 10, 16 and inserted in a roller rail; then a glass-pane sliding door equipped with the carrier plates 28, 30 is supported on the floor and erected such that the coupling pieces 16 pass into the channels 26. Subsequently, the glass-pane sliding door is provisionally fixed to the carrier plates 28 by tightening the respective screws 48. Thereupon, the counter nut disks 66 are inserted in the circular holes 22, and the adjusting screws 68 are screwed from the bottom into the counter nut disks 66 and tightened with the help of a tool put into their head parts 80 from below in order to lift and adjust the glass-pane sliding door. Then, the eccentric disks 44 are set and fixed, as shown in Fig. 2, for lateral adjustment of the glass-pane sliding door. Thereafter, the worm screws 88, 90 are tightened. Finally, the caps 106 are put onto the carrier plates 28, 30 where they are aligned and fastened in the described manner.

It will be appreciated that a variety of glass-pane sliding doors can be easily mounted and adjusted substantially from one side thereof, for instance in front of or within a parking pocket known as such. In so doing, the assembly (the connection of the glass-pane sliding door to the coupling piece) and the lifting of the glass-pane sliding door are basically separate from the adjusting step (relating to the vertical and lateral position), although same components are used for these purposes. A particular advantage resides in that the assembly and adjustment can be carried out from one side of the glass-pane sliding door in a manner providing easy access.

## TABLE OF REFERENCE NUMERALS

	2 roller	
5	4 roller	
	6 shaft	
	10 screw thread	
	12 female thread	
	14 mounting portion	
10	16 coupling piece	
	18 flat surface	
	20 oblong hole	
	22 circular hole	
	24 shoulder-like extension	
15	26 channel	
	28 carrier plate	
	30 carrier plate	
	32 screw	
	34 screw	
20	40 screw head	
	42 threaded hole	
	44 eccentric disk	
	48 flat-head screw	
	50 insert member	
25	52 pin	
	54 auxiliary tool	
	56 blind hole	
	58 centric hole	
	60 polygonal wrench	
30	52 polygonal recess	
	64 screw head	
	66 counter nut disk	
	68 adjusting screw	
	70 elongate hole	
35	72 bottom end wall	
	74 oblong hole	
	76 female thread	
	78 circumference of counter nut disk 66	

	80 screw head part
	82 thrust block
	84 upper surface
	86 lower surface
5	88 worm screw
	90 worm screw
	92 female thread
	94 female thread
	96 side wall
10	98 side wall
	100 worm screw
	102 female thread
	104 peripheral edge
	106 masking cap
15	114 mounting portion
	128 carrier plate
	130 carrier plate
	132 glass pane
	134 roller rail
20	136 roller rail



## CLAIMS

1. Mounting assembly for suspending a glass-pane sliding  
5 door from a horizontal rail, the assembly comprising at least  
one slide (6, 10) displaceable along the rail and at least one  
door carrier connectable to the slide and provided with two  
carrier plates (28, 30) receiving the glass-pane sliding door  
between the carrier plates, characterised in that a coupling  
10 piece (16) of the door carrier is provided for connection to  
the slide and that the glass-pane sliding door equipped with  
the carrier plates (28, 30) and supported from below can be  
coupled to the coupling piece (16) and lifted from the  
supported position to a suspended position and adjusted  
15 vertically in the suspended position by a lifting and adjusting  
means accessible from one flat surface of the glass-pane  
sliding door.

2. Mounting assembly, in particular according to claim 1,  
characterised in that the coupling piece (16) is horizontally  
20 adjustable relative to the door carrier in the direction of the  
flat sides of the glass-pane sliding door.

3. Mounting assembly according to claim 1 or 2,  
characterised in that the coupling piece (16) is arranged to be  
fixed in its adjusted position on the door carrier by a fixing  
25 means.

4. Mounting assembly according to claim 2 or 3,  
characterised in that the coupling piece (16) is provided with  
an oblong hole (20) and an eccentric (44) is rotatably  
 journaled on the door carrier between vertical longitudinal  
30 surfaces of the oblong hole (20) and is arranged to be fixed in  
any angular position.

5. Mounting assembly according to claim 4, characterised  
in that the eccentric (44) is rotatably journaled on a screw  
(48) engageable in a carrier plate (28), the screw (48)  
35 enabling the eccentric (44) to be fixed in different angular  
and vertical positions relative to the coupling piece (16).

6. Mounting assembly according to claim 5, characterised  
in that a front surface of the eccentric (44) facing the

coupling piece (16) is seated on an inner peripheral shoulder (24) of the oblong hole (20) while a rear surface of the eccentric (44) facing away from the coupling piece (16) is flush with an outer surface of the coupling piece (16).

5        7. Mounting assembly according to any of the preceding claims, characterised in that at least one of the carrier plates (28, 30) comprises a vertical channel (26) closed by a lower end wall (72) for receiving the coupling piece (16) and that an adjusting screw (68) penetrating an opening (70) in the  
10       end wall (72) can be screwed from below into the coupling piece (16) and that a head (80) of this screw (68) is seated from below against the end wall (72) when the glass-pane sliding door is in its suspended position.

      8. Mounting assembly according to claim 7, characterised  
15       in that the adjusting screw (68) passes through elongate holes (70, 74) in the end wall (72) of the channel (26) and in the coupling piece (16), respectively, which holes (70, 74) extend parallel to the flat surfaces of the glass-pane sliding door; that the adjusting screw (68) engages a nut (66) which is  
20       supported in the coupling piece (16) and is rotatable about an axis perpendicular to the flat surfaces of the glass-pane sliding door; and that a thrust block (82) is arranged between the screw head (80) and the end wall (72) of the carrier plate (28), a cylindrical convex upper surface (84) of the thrust  
25       block (82) being seated on a cylindrical concave lower surface (86) of the end wall (72) such that the adjusting screw (68) can follow different positions of the coupling piece (16) relative to the carrier plate (28).

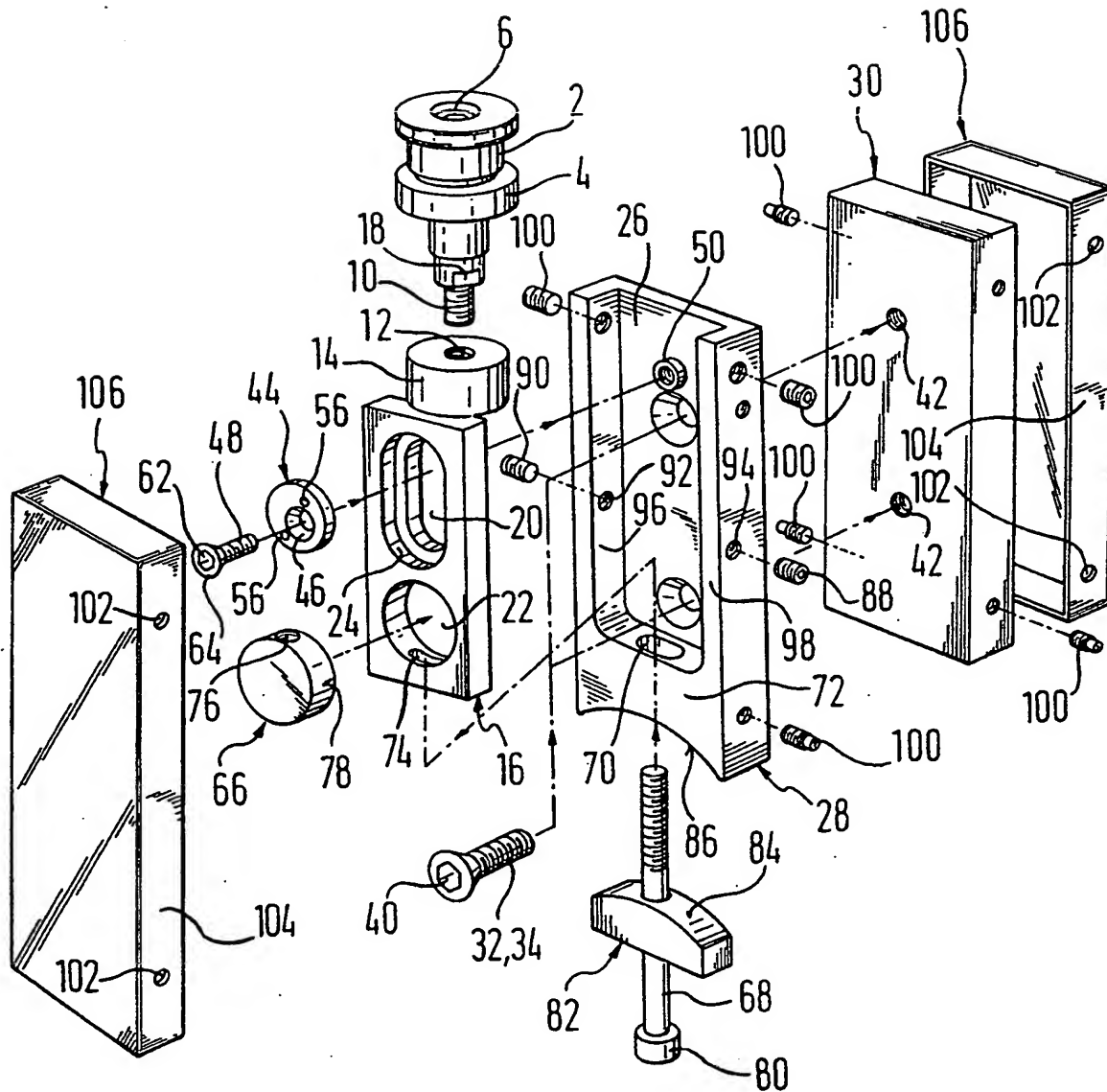
      9. Mounting assembly according to claim 7 or 8,  
30       characterised in that all parts received in the channel (26), and possibly also the thrust block (82), do not exceed an exterior outline surface of the channel (26).

      10. Mounting assembly according to any of claims 7 to 9, characterised in that the coupling piece (16) comprises a lower  
35       adjusting portion fixable in the channel (26) and an upper mounting portion (14) horizontally displaced relative to the adjusting portion transversely to the flat surfaces of the glass-pane sliding door, the mounting portion (14) allowing the

glass-pane sliding door to be attached centrically below the slide.

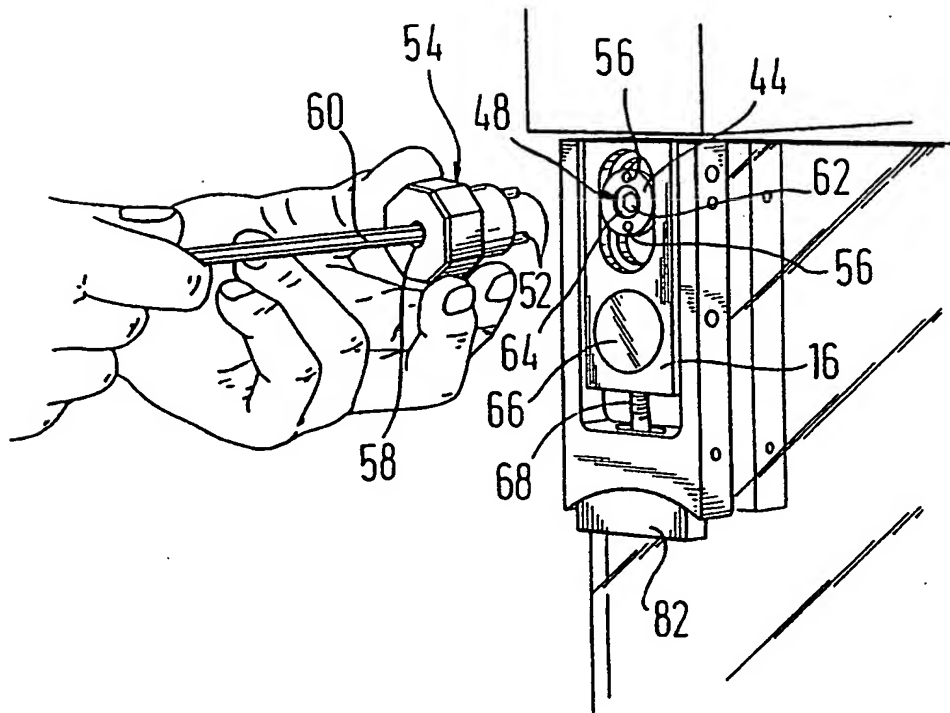
11. Mounting assembly according to any of the preceding claims, characterised in that caps (106) having dimensions  
5 exceeding those of the carrier plates (28, 30) are arranged to be mounted to the plates (28, 30) in different adapted positions.

Fig. 1



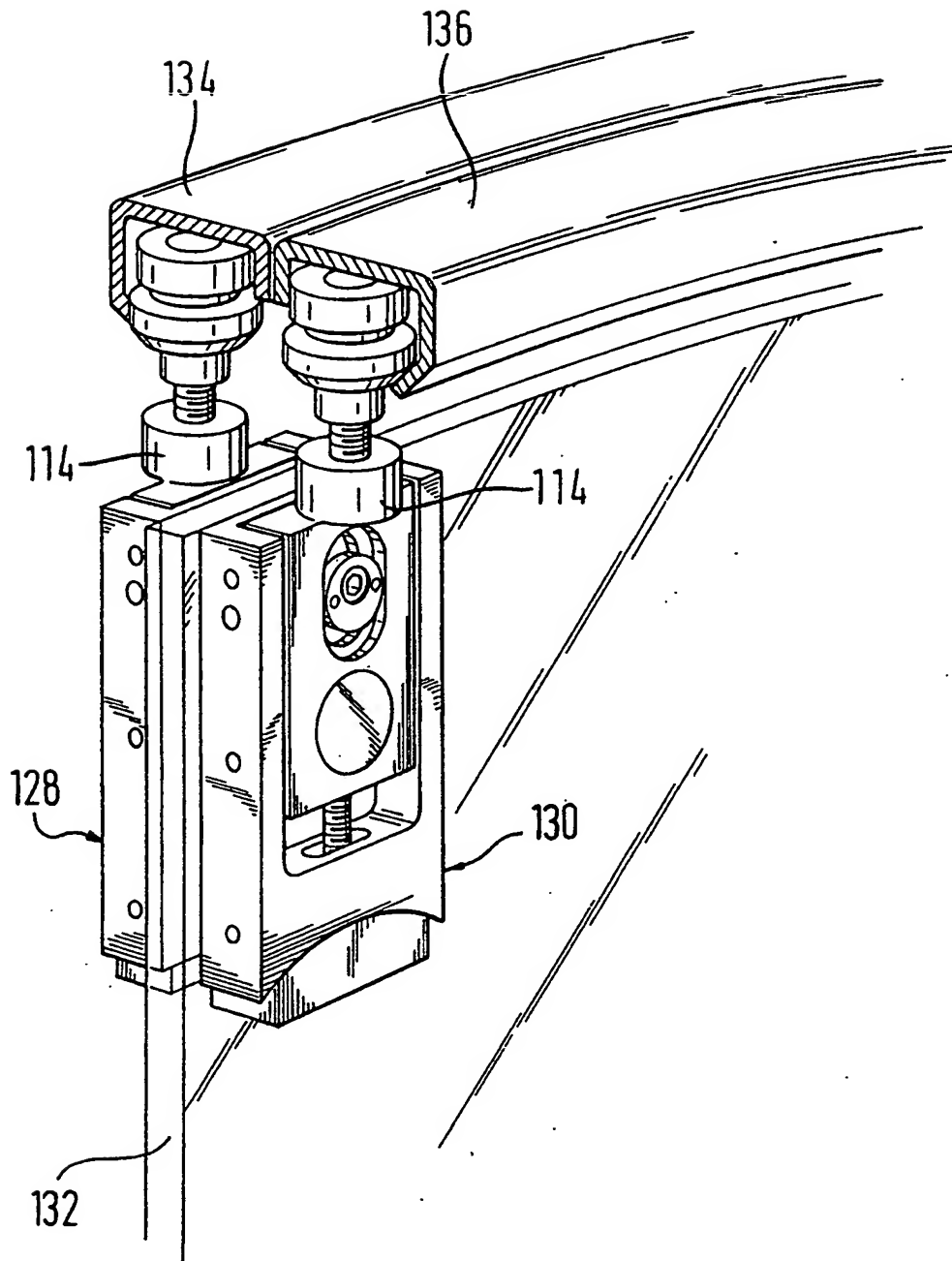
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Fig. 2



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Fig. 3



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A. CLASSIFICATION OF SUBJECT MATTER  
IPC 5 E05D13/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)  
IPC 5 E05D A47K E06B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP,A,0 501 191 (ALTURA LEIDEN HOLDING B.V.) 2 September 1992 see column 6, line 12 - line 15 see column 6, line 55 - column 7, line 43; figures 7,8	1-3
A	DE,U,88 03 188 (DORMA-GLAS GESELLSCHAFT FÜR GLASTÜRBESCHLÄGE UND KONSTRUKTIONEN MBH) 15 September 1988 see page 7, line 11 - line 25; figure 2	1-3
A	US,A,3 142 859 (C. R. SUSKA) 4 August 1964 see the whole document	1,2
A	US,A,3 187 371 (R. M. WINNAN ET AL) 8 June 1965 see the whole document	1,7
-/--		

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

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## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	FR,A,1 443 405 (SOCIÉTÉ GEORGES GUENNE & CIE) 16 May 1966 see the whole document ---	1
A	EP,A,0 443 305 (LINDPOINTNER TORE GMBH) 28 August 1991 see the whole document -----	1



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DE-U-8803188	15-09-88	EP-A, B 0332155 US-A- 4991257	13-09-89 12-02-91
US-A-3142859		NONE	
US-A-3187371		NONE	
FR-A-1443405		NONE	
EP-A-0443305	28-08-91	NONE	

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